20811TO' 6EET500T

Applicant: Santosh C. Lolayekar et al.
Title: ENFORCING QUALITY OF SERVICE IN A STORAGE NETWORK
Attorney Docket No.: MARA-01006US0 SBS
Attorney: Sarah Barone Schwartz Express Mail No.: EL670728874US

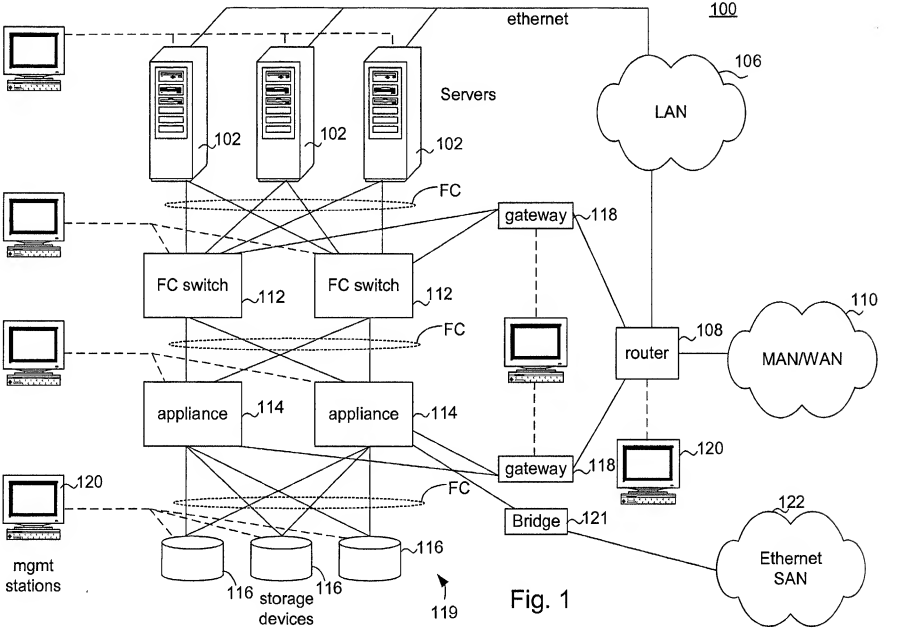

Fig. 1

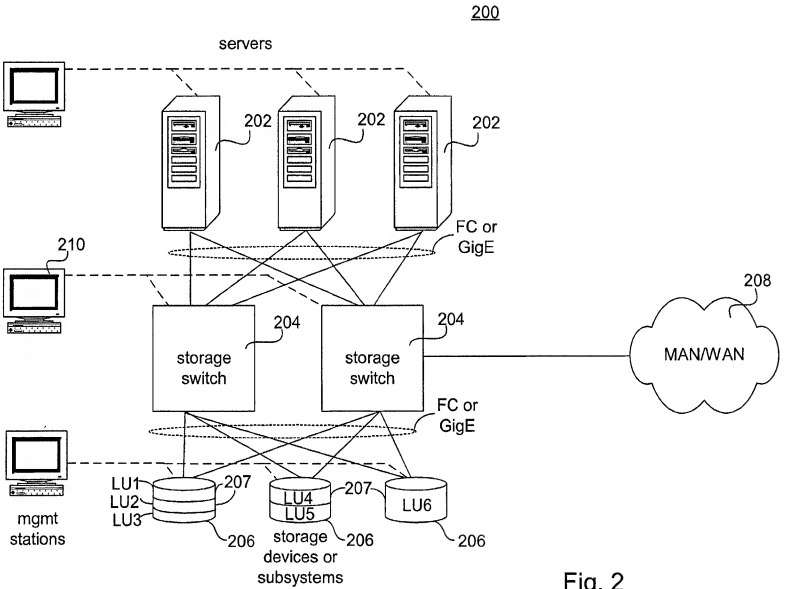
200
servers
202
202
202
FC or
GigE
210
208
204
204
storage
switch
storage
switch
MAN/WAN
FC or
GigE
LU1
LU2
LU3
207
LU4
LU5
207
LU6
mgmt
stations
206
storage
devices or
subsystems
206
206

Fig. 2

302
GigE or FC
Multi-layer storage switch
204
208
PoS or 10GigE
MAN/WAN
304
204
Multi-layer storage switch
GigE or FC
ethernet
LAN
ethernet
LAN

Fig. 3

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20040153951

Fig. 4

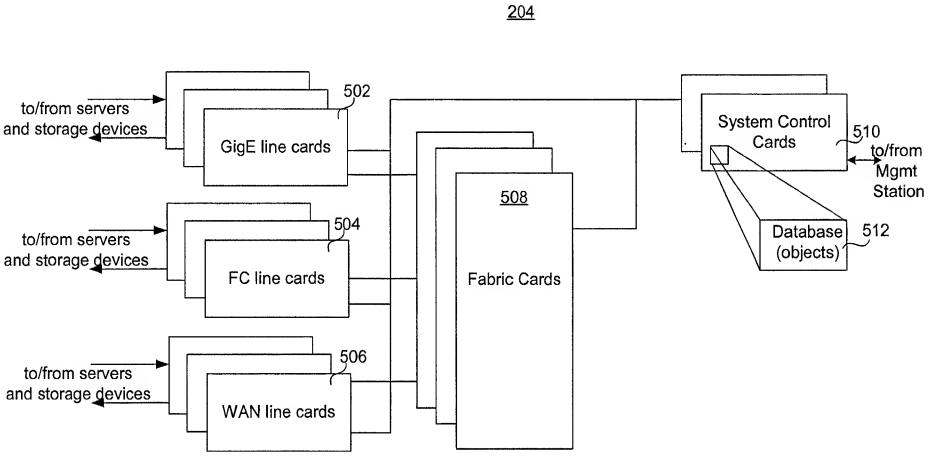
204
to/from servers and storage devices
GigE line cards
502
to/from servers and storage devices
FC line cards
504
to/from servers and storage devices
WAN line cards
506
508
Fabric Cards
System Control Cards
510
to/from Mgmt Station
Database (objects)
512

Fig. 5

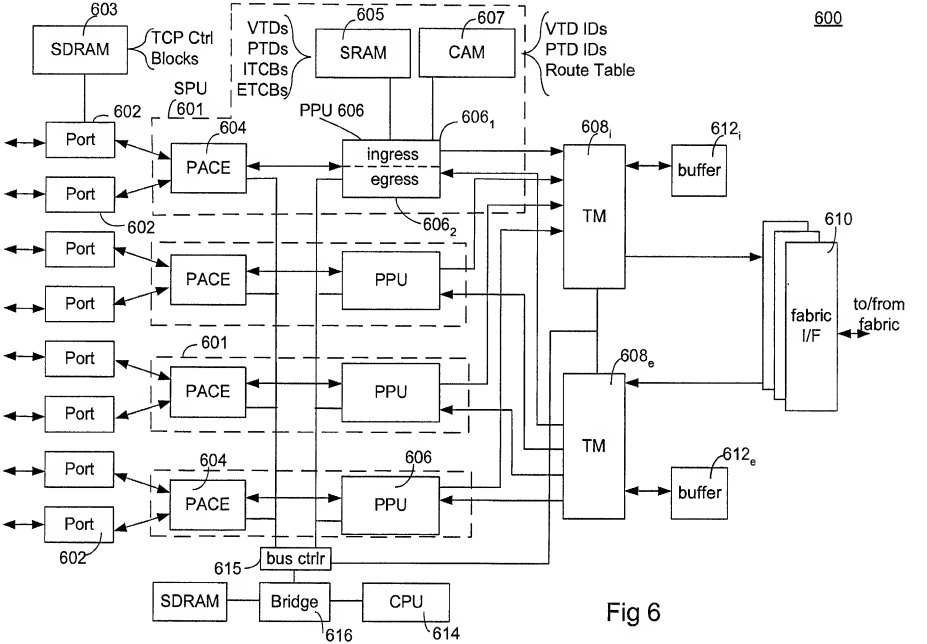
600
603
SDRAM
TCP Ctrl Blocks
VTDs
PTDs
ITCBs
ETCBs
605
SRAM
607
CAM
VTD IDs
PTD IDs
Route Table
SPU
601
PPU 606
602
Port
604
PACE
606₁
ingress
egress
606₂
608ᵢ
612ᵢ
buffer
TM
610
fabric I/F
to/from fabric
PPU
608ₑ
612ₑ
615
bus ctrlr
SDRAM
Bridge
CPU
616
614

Fig 6

VTD

Session ID/FCP D_ID
VTD ID
FlowID
Extent Descriptors (e.g., size, location) -- for each mirrored member if more than one member
# of outstanding commands
Max # of commands
Response time
LUN
TCP control block index
S_ID/D_ID
MaxCmdSN
Total open sequences

Fig. 7a

PTD

Session ID/FCP D_ID
LUN
Block Offset
Size
VTD ID

Fig. 7b

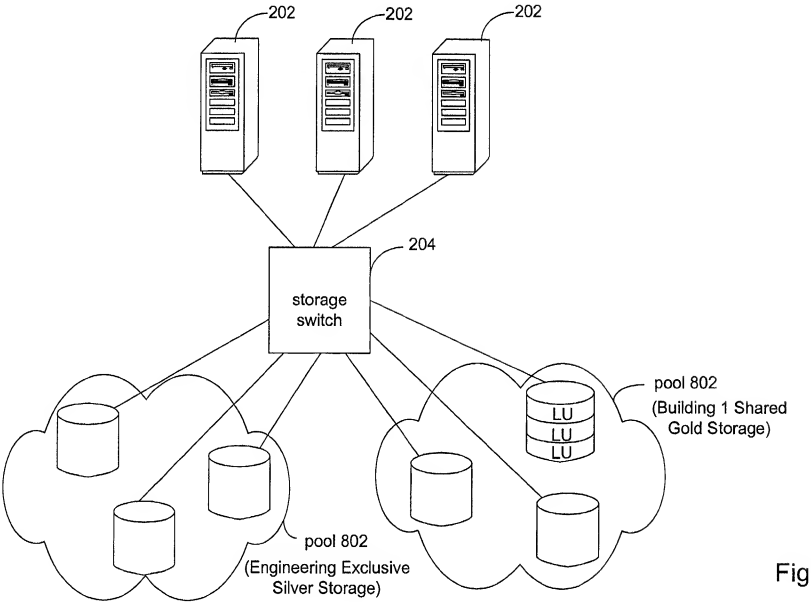
202
202
202
204
storage switch
pool 802
(Building 1 Shared Gold Storage)
LU
LU
LU
pool 802
(Engineering Exclusive Silver Storage)

Fig. 8

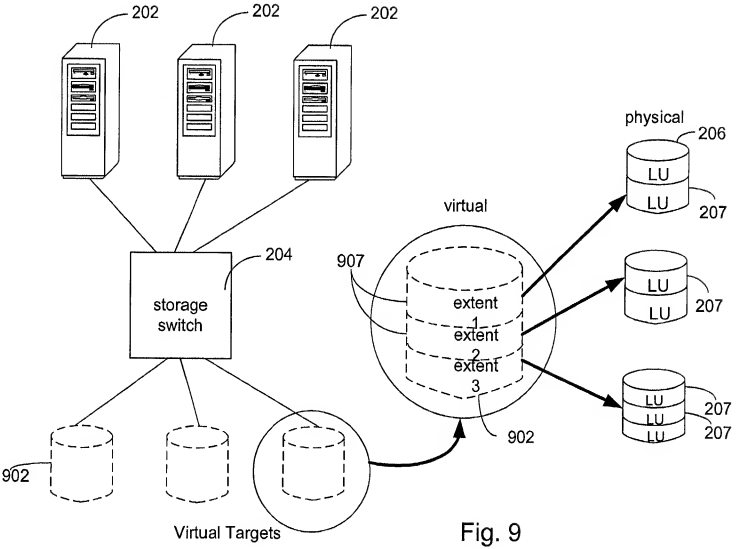
202
202
202
physical
206
LU
LU
207
virtual
907
extent 1
extent 2
extent 3
902
204
storage switch
902
Virtual Targets

Fig. 9

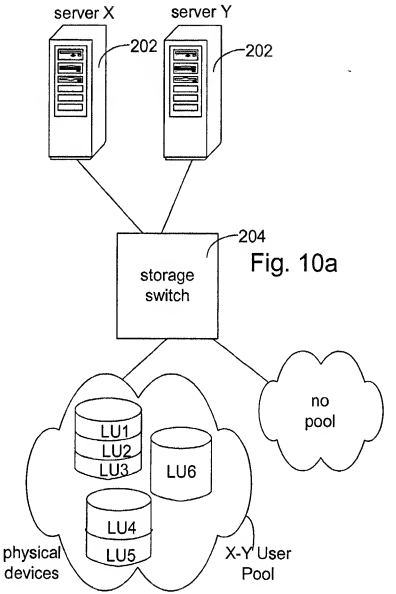

Fig. 10a

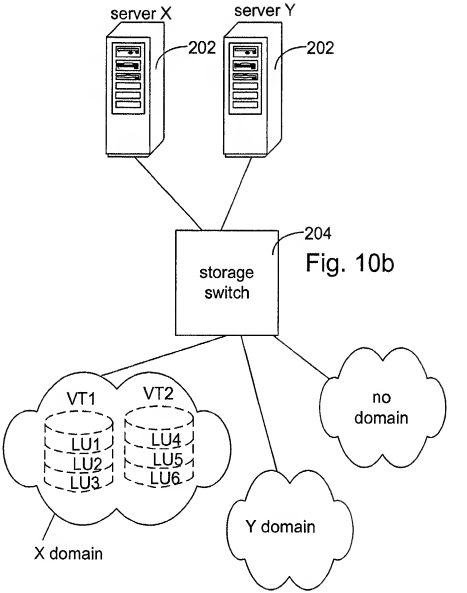

Fig. 10b

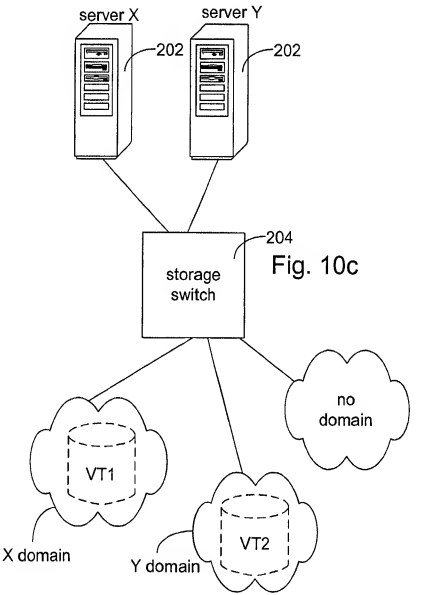

Fig. 10c

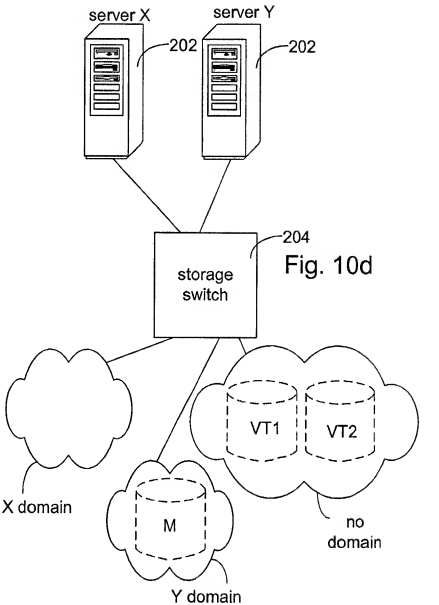

Fig. 10d

20040143-0158001

Fig. 11

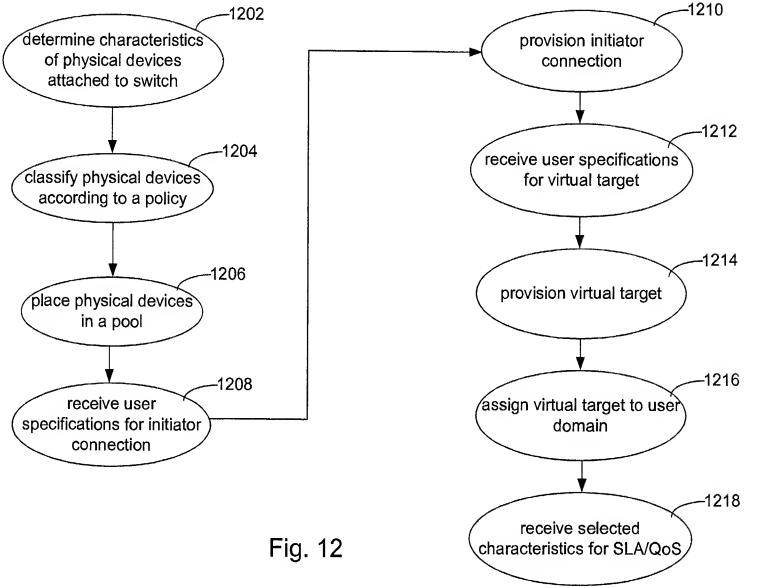
1202
determine characteristics of physical devices attached to switch
1204
classify physical devices according to a policy
1206
place physical devices in a pool
1208
receive user specifications for initiator connection
1210
provision initiator connection
1212
receive user specifications for virtual target
1214
provision virtual target
1216
assign virtual target to user domain
1218
receive selected characteristics for SLA/QoS

Fig. 12

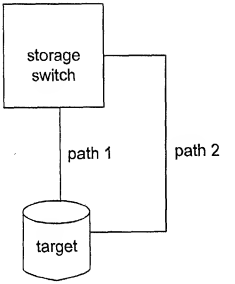

Fig. 13a

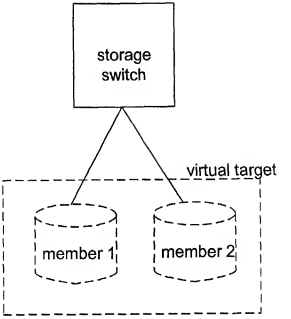

Fig. 13b